COMP5329 - Deep Learning

Assignment-1

Due: Friday, 23 April 6:00 p.m. (Week 7)

1. Task description

Based on the codes given in Tutorial: Multilayer Neural Network, you are required to accomplish a multi-class classification task on the provided dataset.

In this assignment, you are expected to implement the modules specified in the marking table.

You must guarantee that the submitted codes are self-complete, and the newly implemented modules can be successfully run in common python environment.

You are **NOT** allowed to use Deep Learning frameworks (e.g. PyTorch, Tensorflow, Caffe, and KERAS), or any kinds of auto-grad tools (e.g. autograd).

Scientific computing packages, such as NumPy and SciPy, are acceptable.

If you have any question about the assignment, please contact:

Mr Gary Jiajun Huang <jhua7177@uni.sydney.edu.au>

2. Dataset

The dataset can be downloaded from **Canvas.** There are 10 classes in this dataset. The dataset has been splited into training set and test set.

3. Instructions to hand in the assignment

3.1 Go to Canvas and upload the following files/folders compressed together as a zip file

a) Report (a pdf file)

The report should include each member's details (student ID and name).

b) Code (a folder)

If you work as a group, only one student needs to submit the zip file which must be named as student ID numbers of all group members separated by underscores. E.g. "xxxxxxxx_xxxxxxxx_xxxxxxxx .zip"

3.2 Your submission should include the report and the code. A plagiarism checker will be used. Clearly provide instructions on how to run your code in the appendix of the report.

3.3 The report must clearly show (i) details of your modules, (ii) the predicted results from your classifier on test examples, (iii) run-time, and (iv) hardware and software specifications of the computer that you used for performance evaluations.

3.4 There is no special format to follow for the report but please make it as clear as possible and similar to a research paper.

Late submission:

Suppose you hand in work after the deadline:

If you have not been granted special consideration or arrangements

– A penalty of 5% of the maximum marks will be taken per day (or part) late. After ten days, you will be awarded a mark of zero.

– e.g. If an assignment is worth 40% of the final mark and you are one hour late submitting, then the maximum marks possible would be 38%.

– e.g. If an assignment is worth 40% of the final mark and you are 28 hours late submitting, then the maximum marks possible marks would be 36%.

– Warning: submission sites get very slow near deadlines

– Submit early; you can resubmit if there is time before the deadline.

4. Marking scheme

Category	Criterion	Marks	Comments
Report [50]	Introduction [5] - What's the aim of the study? - Why is the study important?		
	Methods [15] - Pre-processing (if any) - The principle of different modules - What is the design of your best model?		
	Experiments and results (with **Figures or Tables**) [20] - Performance in terms of different evaluation metrics. - Extensive analysis, including hyperparameter analysis, ablation studies and comparison methods. - Jusitification on your best model.		
	Discussion and conclusion [5] - Meaningful conclusion and reflection		
	Other [5] - At the discretion of the marker: for impressing the marker, excelling expectation, etc. Examples include fast code, using LATEX, etc.		
Modules [40]	More than one hidden layer [5]		
	ReLU activation [5]		
	Weight decay [5]		
	Momentum in SGD [5]		

	Dropout [5]		
	Softmax and cross-entropy loss [5]		
	Mini-batch training [5]		
	Batch Normalization [5]		
Code [10]	Code runs within a feasible time [5]		
Code [10] Penalties [-]	Well organized, commented and documented [5]		
	Badly written code: [-20]		
Penalties [-]	Not including instructions on how to run your code: [-30]		
	Late submission		